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Assessing the Impact of Education and Marriage on Labor Market Exit Decisions of Women

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Abstract: During the late 1990s, the convergence of women's labor force participation rates to men's rates came to a halt. This paper explores the degree to which the role of education and marriage in women's labor supply decisions also changed over this time period. Specifically, this paper investigates women's decisions to exit the labor market upon the birth of a child. The results indicate that changing exit behavior among married, educated women at this period in their lives was not likely the driving force behind the aggregate changes seen in labor force participation. Rather, changes in exit rates among single women, particularly those less educated, are much more consistent with the changing pattern of aggregate female labor force participation.

JEL classification: J22, J11

Key words: labor force participation, labor supply, labor market exit, opt out, administrative data

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Assessing the Impact of Education and Marriage on Labor Market Exit Decisions of Women

I. Introduction and Background

In the late 1990s, the steady march of women's labor force participation rates towards convergence with those of men came to a halt. There is no consensus in the literature as to the source of this change in labor force patterns, although much of the attention has focused on the behavior of married and highly educated women, especially those with children (e.g., Cohany and Sok 2007). The analysis in this paper will focus on the role marriage and education play in women's decisions to exit the labor market at a time of major transition--the birth of a child--and how the importance of those factors changed during the 1990s. The relevance of investigating exit decisions arises from the attention some literature has given to the notion that women, particularly married and educated women, are "opting out," meaning they were previously attached to the labor market and are increasingly choosing to exit (Boushey 2005 and Goldin 2006).

Many have identified that the recent decline in labor force participation rates of women has been concentrated among highly educated women with young children (Goldin 2006, Bradbury and Katz 2005). Others have identified both characteristics and behavior (e.g., Reimers and Stone 2007 and Hotchkiss 2006), as well as strength of the labor market (Boushey 2005), as contributors to the observed decline in labor force participation . If the declining labor force participation rates among women can be tied to changes in behavior among married and educated women, one would expect to see those behavioral changes reflected in decisions made during a particularly transitional period in women's lives. The birth of a child has been found to have a profound impact on the decision of women to exit the labor market, even among very highly educated women (Herr and Wolfram 2009).

Figure 1 shows the incidence of women exiting the workforce after giving birth, based on the data used in this analysis. The exit rate flattened in the late 1990s and then began increasing in 2000 (with a slight down tick in 2002, which is the last year of available birth data). This exit pattern is consistent with the flattening out and subsequent decline of the national labor force participation rates of women which began in the late 1990s, also shown in the figure.

[Figure 1 here]

The analysis in this paper covers the period 1994-2002, and combines vital statistics birth information with employment data in order to capture information on the immediate factors that affect decisions to exit the workforce at time of birth, including information on the mother and child's health, the characteristics of the mother's industry and firm, and the mother's employment history. We find that the impact of marriage and education on exit decisions did change through the 1990s, but not in a way that would be expected, given the focus on the behavior of married, educated women. As it turns out, the exit pattern depicted in Figure 1 was driven by changing behavior of single women, both high school and college educated.

The bulk of the literature on the question of women returning to work after having a child is focused on the specific policy impact of the availability of paid maternal or paternal leave (for example, see Burgess et al. 2008; Mogstand and Pronzalo 2007; Ondrich, et al. 1996; Pronzanto 2007; Rønsen and Sundström 2002; Joesch 1997; Waldfogel, et al. 1999; Kenjoh 2005; Gustafsson, et al. 1996; Pylkkänen and Smith 2004; and Ruhm 1998). The focus of this paper is quite different from these studies. It is concerned with how the relationship between the education and marital status of women and their decision to return to work has potentially changed over a specific period of time. While not intended to address a specific policy, the results of this study will quantify the environment in which policies, such as maternity leave,

operate. Biased policy assessment could result from the assumption that the relationships between women's characteristics and their decisions remain constant over time.

When studies include measures of a woman's education (or wage level) they sometimes find contradictory evidence on the link between these measures and her decision to return to work after having child. Some studies find that more educated women are less likely to return to work after the birth of a child (Waldfogel, et al. 1999), or, at least, take longer to do so (Burgess, et al. 2008). Others find that more educated women are *more* likely to return to work (Kenjoh 2005), or return more quickly (Pronzato 2007). All of these studies, however, were performed within the context of the women in question having access to some form of (usually paid) maternity leave. In addition, Klerman and Leibowitz (1994) find that more educated and married women were more likely than their counterparts to be on leave, with the expectation of returning to work, when their children were born.

While conclusions vary across some dimensions in these studies, they all agree that past labor market experience is a very strong determinant in being in the labor market after the birth of a child. This analysis controls for the intensity of labor market experience, but abstracts from the initial decision to enter the labor market (pre-birth) by limiting the analysis to women who have already demonstrated some level of commitment to the labor market by being employed before giving birth. This is the group of women for which the research question in this paper is most relevant. Is the behavior of women, especially married and educated women, changing over time, such that those who have a previous labor market connection are making labor force participation decisions differently than they used to? In other words, is there evidence that married and educated women previously attached to the labor force are increasingly likely to exit, or "opt out?" The circumstances of the decision to exit the labor market investigated in this

paper are, by design, narrow. There are other periods in a woman's life that she could decide to exit the labor market, but one might expect the birth of a child to have the most dramatic effect on that decision.

II. Empirical Model

The propensity for a woman to exit the workforce at the time of birth, conditioning on working prior to birth, is expressed as the following reduced-form stochastic equation and estimated via maximum likelihood probit:

$$\Pr(e_i = 1 \mid \text{working prior to birth}) = \alpha_0 + X_i'\alpha_1 + Y_i'\alpha_2 + Z_i'\alpha_3 + \varepsilon_i . \quad (1)$$

The probability of exiting the workforce after birth is determined by demographic, human capital, and geographic characteristics, X_i; health characteristics of the woman and her child, Y_i; and the characteristics of pre-birth firm and industry, Z_i. Details of the regressors included in each of these vectors are in the next section. The specification in equation (1) is modified to include time dummy variables and time interactions with the marital and education status of the women to determine whether the decision to exit has changed, particularly along these dimensions of women's characteristics.

The variables included in Z_i correspond to the firm and industry in which the woman was most recently employed prior to the birth of her child. One concern is that industry characteristics as determinants of a woman's exit decision might be endogenous. A woman might choose a specific industry anticipating intermittent labor market activity. However, Desai and Waite (1991) present evidence that women do not choose their occupation based on the expected ease of re-entry after exiting for child bearing and rearing. We would expect the potential for endogeneity of industry choice to be even weaker than endogeneity of occupational choice. Nonetheless, to mitigate this potential for bias, many demographic characteristics are

included to help control for individual heterogeneity. Industry dummy variables are also included to draw any endogeneity bias away from the impact that specific characteristics of those industries might have on the exit decision. In addition, the industry characteristics of interest are those associated with the timing of the exit decision, and because these characteristics change over time, any remaining bias is expected to be negligible. Regrettably, there is no indicator for whether a woman has access to maternity benefits, but many of the employer characteristics and worker characteristics included in the analysis, such as firm size and industry and worker labor market experience, are associated with the likelihood that the firm offers maternity benefits (see Lovell et al. 2007 and Averett and Whittington 2001).

Human capital and demographic characteristics, included in X_i, are expected to influence a woman's return to being in the labor market, thus they will affect a woman's exit decision. Factors affecting the individual's reservation wage, such as health characteristics and welfare receipt, included in Y_i, will also impact the exit decision. Life style choices, such as smoking and prenatal care, are also included. These measures tell us something about the rate of time preference and could also be related to exit decisions.

There is a well-established relationship between labor force participation decisions and the strength of the labor market (for example, see Hotchkiss and Robertson 2006). Strong labor markets increase the opportunity cost of being absent and should thus decrease the probability of exiting. The seasonally adjusted quarterly unemployment rate for the state is included to capture this relationship.

In order to identify potential behavioral changes in the decision to exit the labor market upon the birth of a child, year dummy variables are interacted with measures of education and marital status. Year dummy variables are also included separately in order to capture changes in

exit decisions over time not explained by observed characteristics.

Geographic characteristics of the woman's county of residence are included as controls for differences in employment opportunities and resources available for working mothers, such as quality child care.

III. Data

This paper utilizes Vital Statistics birth records from the State of Georgia for the period 1994 to 2002 linked with three sets of state administrative records and the Public Use Microsample of the Census (PUMS). The first two, the Employer File and the Individual Wage File, are compiled by the Georgia Department of Labor for the purposes of administering the state's Unemployment Insurance (UI) program. The third data set contains Welfare Recipient Data from the Georgia Department of Human Resources. All the data used in the analysis are highly confidential and strictly limited in their distribution.

An obvious question is whether data from Georgia are sufficiently representative to be able to draw conclusions that could be generalized to the U.S. population of women. The only evidence that can be offered on this point is a comparison of labor force participation rates among women in Georgia with those of women in all of the U.S. As can be seen in Figure 2, the labor force participation rates among women in Georgia, while more volatile, exhibit the same pattern of increase through the mid-1990s, flattening out, then decline beginning in1999. This suggests that evidence that can be offered about the labor market exit rates of women in Georgia might be applied to behavior of women in the rest of the U.S., as well.

[Figure 2 here]

The vital statistics birth records contain demographic information for the mother and father, including age, race, education, and marital status, as well as information on behavior

during pregnancy, adverse outcomes, comorbid conditions, and complications associated with either the mother or the infant. The Welfare Recipient data provides information on the level of TANF/AFDC benefits received in a quarter.

The Employer File provides an almost complete census of firms in non-farm sectors, covering approximately 97 percent of non-farm workers, with records on all UI-covered firms. The establishment level information includes the number of employees, the total wage bill and the NAICS classification of each establishment.[1] The Individual Wage File contains quarterly earnings information for all of those workers.[2] Regrettably, this data set contains no information about the worker's demographics (e.g., education, gender, race, etc.), thus making it impossible to draw a control group of women not giving birth. There is no specific information about the worker's job (e.g., hours of work, weeks of work, or occupation). The worker's earnings and employer information can be tracked over time and linked to the vital records data using an individual identifier.

A woman is defined as being in the workforce if she worked in any of the four quarters prior to the birth quarter. This definition of workforce participation is designed to capture women who are forced to take time out of their job due to pregnancy related issues and to remove issues of seasonality from the data. A woman is defined as exiting the workforce if she is not working in the second quarter after the birth quarter.[3] The earnings used to proxy for

[1] White et al. (1990) provide an extensive discussion about the use of these employment data, commonly referred to as the Quarterly Census of Employment and Wages (QCEW), or ES-202 data.

[2] Included in earnings are pay for vacation and other paid leave, bonuses, stock options, tips, the cash value of meals and lodging, and in some states, contributions to deferred compensation plans (such as 401(k) plans). Covered employer contributions for old-age, survivors, and disability insurance (OASDI), health insurance, unemployment insurance, workers' compensation, and private pension and welfare funds are not reported as wages. Employee contributions for the same purposes, however, as well as money withheld for income taxes, union dues, and so forth, are reported even though they are deducted from the worker's gross pay.

[3] For example, if a woman gave birth in Quarter 4 of 2000 the pre-birth labor force status would be based on Quarter 4 of 1999 and the first three quarters of 2000 and the exit decision would be based on her labor market status in

specific human capital are the highest quarterly earnings among the four quarters preceding the birth quarter, again in order to minimize any impact of pregnancy related illnesses. Georgia labor market experience and current job tenure are calculated using data on the three years prior to the occurrence of birth. Construction of these variables over a longer period of time is not possible due to data limitations.[4] The number of jobs worked in a quarter in the year preceding birth is constructed as the maximum number of jobs held in any quarter in the year prior to birth and is designed to capture the woman's attachment (or lack thereof) to any particular job.

Job creation in the woman's pre-birth employment industry is measured by the share of jobs in that industry created due to the opening of a new firm or the expansion of an existing firm in the year prior to the exit decision. Conversely, job destruction is measured by the share of jobs in the woman's pre-birth employment industry that were lost due to closure or contraction of a firm in the year prior to the exit decision. The industry turnover rate is measured by the share of employees in the woman's pre-birth employment industry who were not employed by the same employer in the previous year.[5] A firm is considered to have just been born if there was employment in the last four quarters that was preceded by four quarters of zero employment. A firm is considered to be dying if within the next year there are four consecutive quarters of zero employment. A firm is considered to be contracting if the employment in the current quarter is less than employment in that quarter in the previous year and vice versa for expanding.

The prenatal care measure is captured by the number of prenatal care visits and the square of the number of prenatal care visits to capture the nonlinearity due to higher usage by at-

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Quarter 2 of 2001. While the overall incidence of exit vary based on when an exit is defined, the pattern of exit rates over time are unaffected by when exit is defined (from two to five quarters from birth).

[4] As the employment data is limited to employment information for the State of Georgia, individuals who moved to Georgia in the three years prior to birth could have lower levels of labor market experience recorded than was actually incurred.

[5] Job loss, job creation and the turnover rate are the average of the four quarters preceding the exit decision.

risk mothers. The smoking and alcohol dummy variables are equal to one if the mother indicated the use of tobacco or alcohol during pregnancy. In addition, controls for infant health and medical risk factors for the mother, independent of pregnancy, are also included. The unemployment rate is the quarterly seasonally adjusted unemployment rate for the state of Georgia, obtained from the Bureau of Labor Statistics. The county-level characteristics are obtained from Public Use Microsample of the Census.

After excluding observations with missing data, the analysis is performed on 636,928 women who were in the Georgia workforce prior to giving birth for the years 1994-2002. The data were separated for analysis on the basis of whether this was a first birth (FB) for the mother, or a subsequent birth (SB) for the mother. The FB analysis includes 293,249 women and the SB analysis includes 343,679 women who had previously chosen to be a working mother and then gave birth to their second (or more) child.

The data means are presented in Table 1. Overall, approximately one-third of the women chose to exit the labor force upon the birth of a child. The average age was 25 for the FB and 28 for the SB birth group. FB mothers were less likely to be black than SB mothers (30.1 versus 40.5 percent), more likely to have 4 or more years of college (30.1 versus 20.7 percent), and had lower levels of AFDC/TANF benefits ($26.91 versus $75.29 per quarter, on average), as would be expected. The racial difference in the two samples is due both to the fact that black mothers are more likely to continue to work after the birth of a child and that they have more children on average.

[Table 1 here]

Sixty-three percent of the FB sample and 65.1 percent of the SB sample were married, with 21.5 and 19.0 percent of FB and SB, respectively, being single with a father named on the

birth certificate. For the approximately 84 percent of observations with a father named (whether married or not), the average age of the father was 28.2 for FB and 30.7 years for SB. As with the mothers, a much larger share of the fathers are black in SB than in FB while the average education of the father is lower for SB than FB.

There does not appear to be any systematic differences in the industry and firm characteristics for the two groups. The average firm has approximately 2500 workers and 27 establishments. The median quarterly earnings are $3,733.28 for FB and $4,319.87 for SB. Over the three years prior to giving birth, both groups have almost nine quarters of experience, have changed labor market status an average of three times, have just over five quarters of job tenure, and have held an average of approximately 1.4 jobs per quarter.

IV. Results

The full set of maximum likelihood estimation results are found in Appendix A; all estimates are obtained conditional on the woman having been employed in any quarter during the year prior to giving birth and are performed separately for women having their first child and for women having a subsequent (second or greater) child. The expectation is that factors influencing the decision to exit the labor market for these women will be different than for FB mothers (see Rosen and Sunstrom 2002).

The regressors typically perform as expected. For example, those characteristics expected to increase the (opportunity) cost of exiting, such as high wage and education, more labor market experience and job tenure, and size of employer (making maternity benefits more likely) decrease the probability of exit. Whereas those factors decreasing the cost of exiting, or increasing a woman's reservation wage, such as a highly educated father, receipt of welfare ,

being married, poor infant health outcome, and having more children (among subsequent birth mothers) increase the probability of exit.

The analysis focuses on how the exit behavior of these women, particularly married and educated women, has changed over a period of time in which the female labor force participation rates ceased their nearly two decade long increase and actually showed some tendency to decline. To further our understanding of this change, we interact a woman's marital and education status with time dummies to measure how the influence of these characteristics changed over time. These time dummies are also included separately, to account for other time-varying economic influences not captured by variation in other regressors. These results are presented graphically; they are found in Figures 3 and 4.

Marginal effects measuring the difference in the probability of exit for married versus single, and for college educated women versus women with just a high school degree, are presented in Figure 3. For both groups of women, being married increases a woman's probability of exiting and having a college degree decreases the probability of exiting the labor force after the birth of a child, hence the positive marginal impact of marriage (versus single) and the negative marginal impact of college (versus high school).

[Figure 3 here]

Over time, if married, educated women were increasingly likely to exit the labor force and so were driving the decline in labor force participation rates of women beginning in the late 1990s, then Figures 3a and 3b would have a u-shape. In other words, since married women are on average more likely to exit than single women, we would have seen the importance of marriage declining, as labor force participation rates rose, followed by an increase in the contribution of marriage to explaining exits as labor force participation rates declined, *ceteris*

paribus. Note that marriage rates among women in the U.S., and in this sample, declined slightly, and, most importantly, uniformly, over this period.[6] Analogously, since college graduates have a lower exit rate to begin with, we would have seen an increase in the importance of college (larger negative marginal effect), as labor force participation increased, followed by a declining importance of college (smaller negative marginal effect), as labor force participation declined, *ceteris paribus*. Again, the percent of women with a college degree increased, but uniformly, over this period. The marginal effects depicted in Figure 3 are opposite of what we would have expected.

While changing exit patterns among married and college educated women do not seem to be a source of the changing pattern in labor force participation rates over this time period, that doesn't mean that marital status or education in general are not related to the change. Figure 4 plots the average predicted exit probability for four groups of women, disaggregated by marital status and education groups. The only group of women who exhibit a changing pattern of exit rates consistent with the changes in the aggregate labor force participation rate is single women, particularly single women with only a high school education (for both FB and SB women). The exit rates of these women decline through the late 1990s, consistent with the rising labor force participation rates, flatten out, then begin to rise starting in 1999. While much less dramatic, the exit rates among single college educated women exhibit a u-shaped -- consistent with the changing pattern of aggregate labor force participation.

[Figure 4 here]

Figure 4 suggests that it was behavior changes among single women upon the birth of a child, especially less educated single women, that contributed to the observed changes in the

[6] Marriage rates and college attainment rates among women can be found at http://www.census.gov/population/www/socdemo/hh-fam.html#history (marriage) and http://www.census.gov/population/www/socdemo/educ-attn.html (college), accessed 1 December 2009.

labor force participation rates. The exit rates of married women either consistently rose through the entire period (high school educated), or exhibited an inverted u-shaped pattern (college educated), which is the opposite of the pattern that would be necessary to be contributing to the observed change in labor force participation.

Note, the recession did not begin until 2001, thus it cannot be the driving force behind the behavioral change that began among single women at least three years prior. However, the exit rates among single women did increase dramatically in 2001, which could have been some consequence of the recession.

V. Conclusion

There is no question that labor force participation among college educated, particularly married college educated, women stopped its march upward and even declined in the late 1990s. The question posed in this paper is whether a changing pattern of labor market exit, or "opt out," rates upon the birth of a child could help to explain this phenomenon. The estimated change in the marginal impact of being married and of being college educated is contrary to the change that would be required to explain the changing aggregate labor force participation rates. In other words, married (and college educated) women became increasingly likely to exit upon the birth of a child while labor force participation was rising and started becoming less likely to exit when labor force participation began to decline.

Disaggregating further, it turns out that these counter-intuitive changes in marginal impacts were being driven by behavioral changes among single women which *were* consistent with the changing pattern of aggregate labor force participation. Exit rates upon the birth of a child among single women, particularly high school educated single women, was dropping through the late 1990s, flattened out, then rose. While the rise in exit rates among high school

educated single women accelerated in 2001, it began at least two years before the recession. College educated single women did not experience the same acceleration in exit rates around the recession.

The results of this paper suggest that the attention surrounding whether women are "opting out" of the labor market might more aptly be focused on single, particularly high school educated single, women. The next obvious question is what drove the change in exit rates among these women. Although an in-depth exploration is beyond the scope of this paper, the sample used in this analysis might provide an initial suggestion of where to look for an answer. By predicting exit rates over time for single, high school graduate mothers, and focusing on each relevant variable in turn, we found that the most likely candidate for a potential explanation for the behavioral change observed among these women is found in the percent of the sample receiving AFDC benefits. The greater the share of single, less educated new mothers receiving AFDC, the lower the average cost of exiting these women face. Figure 5 illustrates this potential relationship. This relationship is similar, but weaker, among SB mothers. While suggestive, this cannot provide a full answer for the changing exit behavior among single, particularly lower educated, women.

[Figure 5 here]

Lastly, the results from this analysis also suggest that one must look beyond exit behavior upon the birth of a child to explain the changing behavior among married, college educated women.

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Figure 1. Percent of mothers exiting the Georgia workforce upon the birth of a child and aggregate female labor force participation rate, 1994-2002.

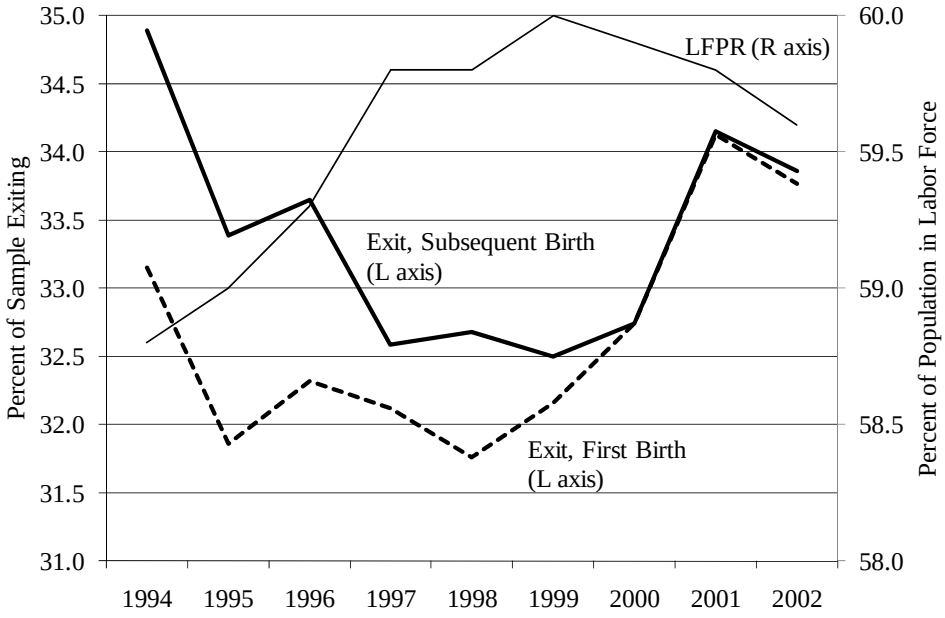
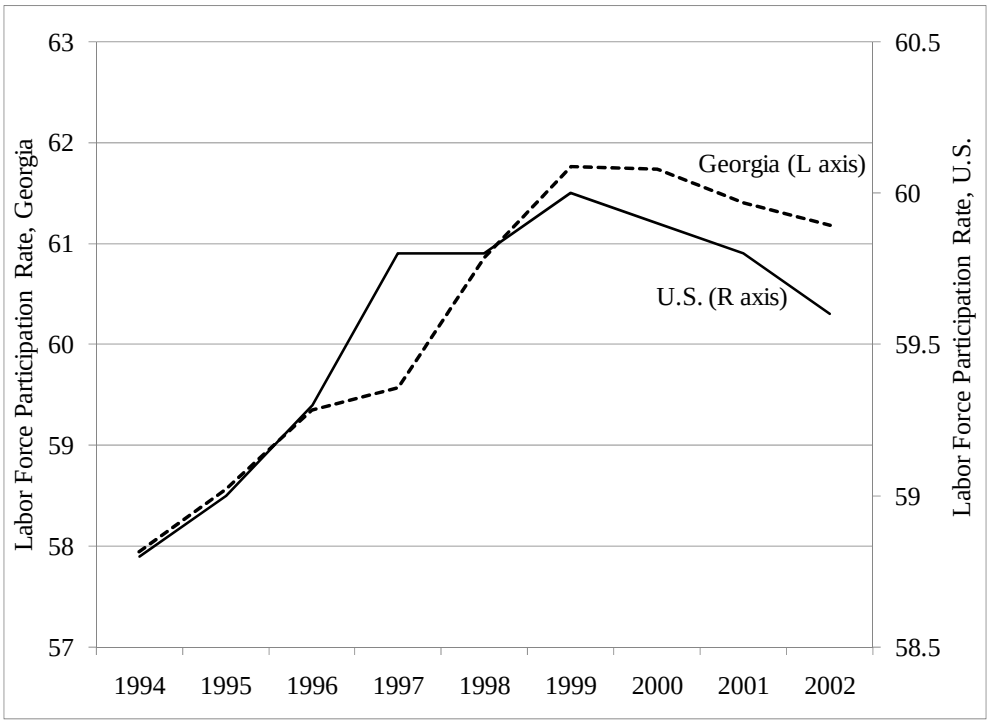
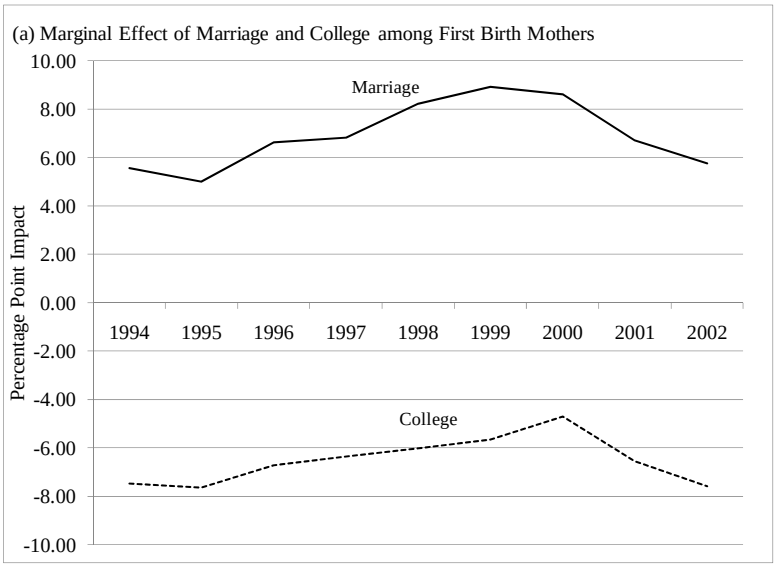


Figure 2. Female labor force participation rates (16+) in the U.S. and in Georgia, 1994-2002.



Source: Current Population Survey; March of each year for Georgia, monthly average for U.S.

Figure 3. Average marginal effect of marriage and four or more years of college on the probability of exiting the workforce upon the birth of a child, 1994-2002.



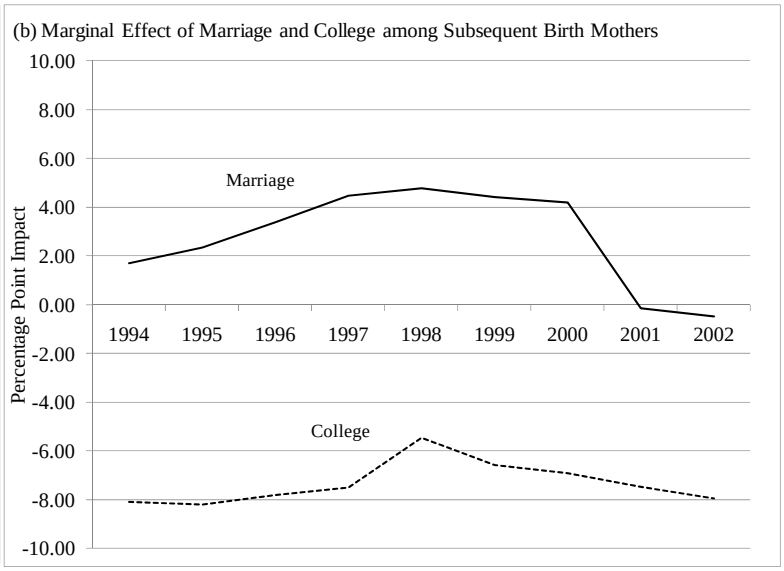


Figure 4. Predicted probability of exit by years of education and marital status, 1994-2002.

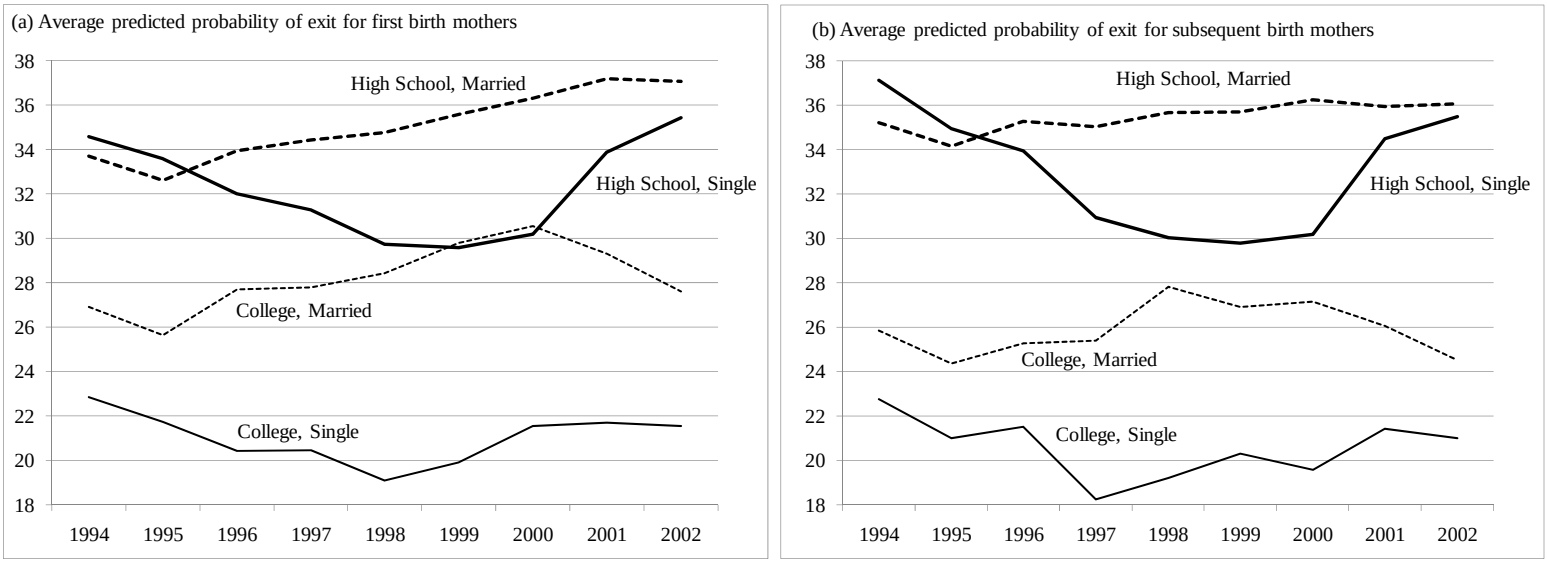


Figure 5. Average predicted exit probability of first birth, single, high school graduate mothers and percent of first birth mothers receiving AFDC, 1994-2002.

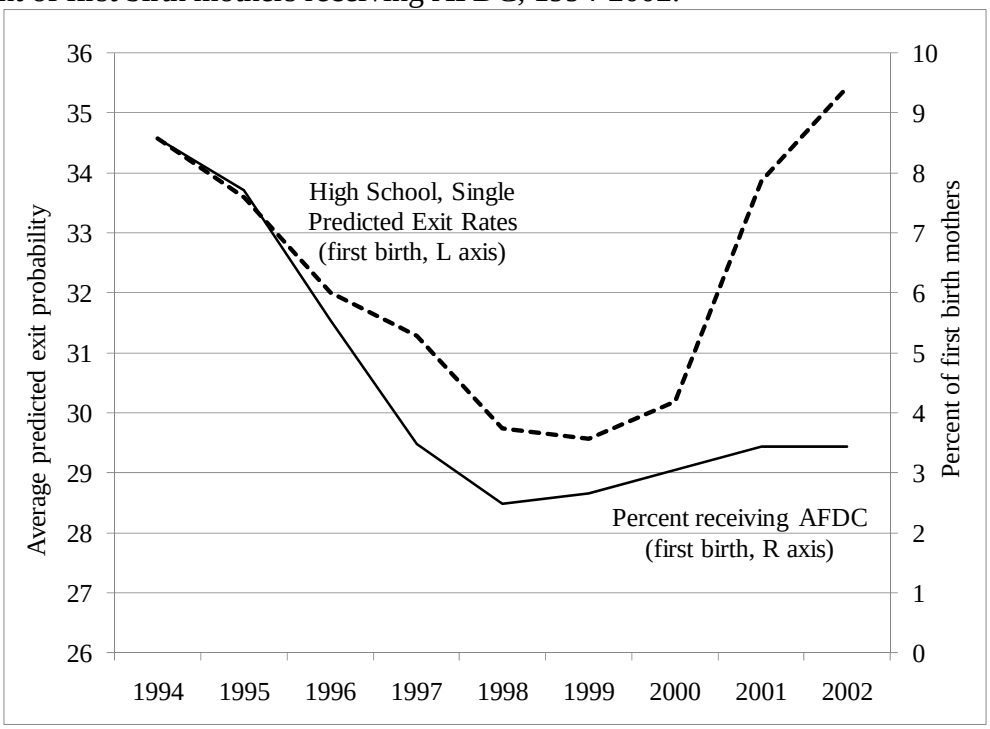


Table 1. Sample means (std. dev.)

Variables	First Birth Sample	Subsequent Birth Sample
N	293,249	344,356
Exit	0.3269 (0.46919)	0.3347 (0.4719)
Industry and Firm Characteristics		
Share of Jobs Destroyed per Quarter	0.1610 (0.0631)	0.1628 (0.0644)
Share of Jobs Created per Quarter	0.1887 (0.0641)	0.1876 (0.0653)
Number of Establishments	61.6499 (58.8026)	58.6157 (57.0502)
Number of Employees per Establishment	18.0343 (29.9336)	19.7240 (31.6685)
Turnover	1.8514 (0.5769)	1.8539 (0.5894)
Average Industry Wage/1000 ($)	7.0771 (3.6585)	6.9521 (3.4839)
Firm Characteristics		
Firm Size	25.3607 (56.3693)	25.2073 (57.3266)
Just Born	0.0259 (0.1589)	0.0255 (0.1575)
Dying	0.0096 (0.0976)	0.0130 (0.1133)
Contracting	0.3276 (0.4693)	0.3417 (0.4743)
Expanding	0.4816 (0.4997)	0.4678 (0.4990)
Job Characteristics		
Quarterly Earnings/1000 ($)	6.1244 (12.6651)	5.2767 (10.1176)
Labor Market Experience	8.9751 (3.4239)	8.8196 (3.4230)
Number of Labor Market Status Changes	2.7373 (2.1742)	2.8489 (2.2827)
Current Job Tenure	5.3753 (4.0228)	5.4325 (4.1184)
Number of jobs per Quarter	1.4233 (0.6740)	1.3735 (0.6464)
Mother's Characteristics		
Age	25.1940 (5.6267)	27.7710 (5.6253)
Black	0.3013 (0.4588)	0.4047 (0.4908)
Hispanic	0.0220 (0.1468)	0.0285 (0.1664)
Less than High School Education	0.1401 (0.3471)	0.1779 (0.3824)

1-3 Years of College Education	0.2312 (0.4216)	0.2319 (0.4220)
4 or More Years of College Education	0.3013 (0.4588)	0.2070 (0.4052)
Married	0.6300 (0.4828)	0.6506 (0.4768)
Single - Father Named	0.2150 (0.4108)	0.1902 (0.3924)
Medicaid Recipient	0.3913 (0.4880)	0.4365 (0.4959)
AFDC/TANF Benefit Level	26.9142 (131.4023)	75.2915 (243.6732)
Father's Characteristics (if named)		
Father's Age	28.2454 (6.2867)	30.6742 (6.3715)
Father Black	0.2582 (0.4376)	0.3510 (0.4773)
Father Hispanic	0.0264 (0.1604)	0.0368 (0.1884)
Father Less than High School Education	0.1241 (0.3297)	0.1533 (0.3603)
Father 1-3 Years of College Education	0.2106 (0.4078)	0.2018 (0.4013)
Father 4 or More Years of College Education	0.3076 (0.4615)	0.2275 (0.4192)
Geographic Characteristics		
Percent of County that is Urban 2000	0.5220 (0.4426)	0.4989 (0.4456)
Median County Income/1000 ($) 2000	44.6790 (11.2108)	43.4262 (11.0595)
Seasonally Adjusted Quarterly Unemployment Rate	4.3091 (0.4974)	4.2974 (0.5031)
Infant Health Outcomes		
Less than 32 Weeks Gestation	0.0196 (0.1387)	0.0171 (0.1297)
Any Congenital Anomaly	0.0107 (0.1031)	0.0101 (0.1000)
Single Birth	0.9854 (0.1198)	0.9841 (0.1251)
Birth weight less than 2500 grams	0.0851 (0.2790)	0.0713 (0.2573)
Mother's Health and Behavior		
Any Complication of Labor and Delivery	0.3488 (0.4766)	0.2495 (0.4327)
Mother Used Tobacco During Pregnancy	0.0737 (0.2612)	0.1118 (0.3152)
Mother Used Alcohol During Pregnancy	0.0068 (0.0821)	0.0093 (0.0961)
Number of Prenatal Care Visits	12.5324 (3.9286)	11.8988 (4.0949)
Number of Previous Live Births Now Living		1.5489 (0.9002)

Cardiac Disease	0.0025 (0.0498)	0.0021 (0.0454)
Diabetes (non-gestational)	0.0180 (0.1328)	0.0204 (0.1413)
Renal Disease	0.0008 (0.0276)	0.0008 (0.0275)
Acute or Chronic Lung Disease	0.0018 (0.0428)	0.0019 (0.0433)
Chronic Hypertension	0.0060 (0.0773)	0.0072 (0.0848)

Appendix A. Complete Estimation Results.

Table A1. Maximum likelihood estimates of the probability of exiting the labor force at time of birth; standard errors in parentheses, marginal effects in brackets.

Variables	First Birth Sample	Subsequent Birth Sample
Constant		
Industry Characteristics		
Share of Jobs Destroyed per Quarter	0.0984*** (0.0236) [0.0316]	0.1352*** (0.0215) [0.0422]
Share of Jobs Created per Quarter	-0.0578** (0.0293) [-0.0186]	-0.1508*** (0.0270) [-0.0471]
Number of Establishments/100	0.0008*** (0.0002) [0.0002]	0.0005** (0.0002) [0.0001]
Average Number of Employees per Establishment	-0.0021*** (0.0006) [-0.0007]	-0.0011** (0.0005) [-0.0003]
Turnover	-0.0233 (0.0202) [-0.0075]	-0.0129 (0.0188) [-0.004]
Average Industry Wage/1,000 ($)	-0.0028 (0.0031) [-0.0009]	0.0015 (0.0030) [0.0005]
Firm Characteristics		
Firm Size (Number of Employees/100)	-0.0007*** (0.0001) [-0.0002]	-0.0005*** (0.0001) [-0.0002]
Just Born	-0.1168*** (0.0185) [-0.0361]	-0.1643*** (0.0175) [-0.0492]
Dying	0.5957*** (0.0267) [0.2054]	0.5083*** (0.0219) [0.1691]
Contracting	0.1088*** (0.0107) [0.0353]	0.0925*** (0.0101) [0.0292]
Expanding	0.0078 (0.0103) [0.0025]	-0.0142 (0.0098) [-0.0044]
Job Characteristics		
Quarterly Earnings/1,000 ($)	-0.0163*** (0.0003) [-0.0052]	-0.0144*** (0.0003) [-0.0045]
Labor Market Experience	-0.0808*** (0.0010) [-0.0260]	-0.1015*** (0.0010) [-0.0317]
Number of Labor Market Changes	0.0652*** (0.0017) [0.0209]	0.0690*** (0.0015) [0.0215]

Current Job Tenure	-0.0192*** (0.0011) [-0.0062]	-0.0168*** (0.0010) [-0.0052]
Number of jobs per Quarter	-0.1915*** (0.0044) [-0.0615]	-0.2123*** (0.0042) [-0.0663]
Mother's Characteristics		
Age	0.0863*** (0.0050) [0.0071]	0.1084*** (0.0044) [0.0072]
Age Squared	-0.0013*** (0.0001)	-0.0016*** (0.0001)
Black	-0.0991*** (0.0109) [-0.0316]	-0.1204*** (0.0108) [-0.0375]
Hispanic	-0.0841*** (0.0199) [-0.0269]	-0.1236*** (0.0184) [-0.0385]
Less than High School Education	0.0617*** (0.0088) [0.0207]	0.0631*** (0.0074) [0.0205]
1-3 Years of College Education	-0.0514*** (0.0075) [-0.0169]	-0.0836*** (0.0068) [-0.0265]
4 or More Years of College Education	-0.2396*** (0.0208) [-0.0754]	-0.2634*** (0.0219) [-0.0804]
Married	0.1946*** (0.0564) [0.0581]	0.0586 (0.0554) [0.0173]
Single- Father Named	0.0520 (0.0532) [0.0159]	-0.0542 (0.0524) [-0.0165]
Medicaid Recipient	0.1581*** (0.0073) [0.0514]	0.1630*** (0.0064) [0.0515]
AFDC/TANF Benefit Level	0.0005*** (0.0000) [0.0001]	0.0002*** (0.0000) [0.0001]
Father's Characteristics		
Father's Age	0.0075** (0.0035) [0.0013]	0.0141*** (0.0032) [0.0014]
Father's Age Squared	-0.0001 (0.0001)	-0.0002*** (0.0000)
Father Black	-0.2949*** (0.0121) [-0.0915]	-0.2815*** (0.0115) [-0.0863]
Father Hispanic	-0.0974*** (0.0198) [-0.0316]	-0.1657*** (0.0177) [-0.0521]
Father Less than High School Education	-0.0569*** (0.0096) [-0.0173]	-0.0534*** (0.0082) [-0.0161]

Father 1-3 Years of College Education	0.0634*** (0.0082) [0.0198]	0.0561*** (0.0075) [0.0173]
Father 4 or More Years of College Education	0.2878*** (0.0090) [0.0938]	0.2291*** (0.0088) [0.0727]
Geographic Characteristics		
Percent of County that is Urban 2000	0.1343*** (0.0110) [0.0431]	0.0596*** (0.0103) [0.0186]
Median County Income/1,000 ($) 2000	0.0005** (0.0003) [0.0002]	0.0596*** (0.0103) [0.0186]
Seasonally Adjusted Quarterly Unemployment Rate	-0.0253 (0.0161) [-0.0081]	0.0296** (0.0150) [0.0092]
Infant Health Outcomes		
Less than 32 Weeks Gestation	0.1137*** (0.0202) [0.0373]	0.1416*** (0.0197) [0.0452]
Any Congenital Anomaly	0.0106 (0.0243) [0.0034]	0.0219 (0.0234) [0.0069]
Single Birth	-0.3822*** (0.0211) [-0.1300]	-0.3423*** (0.0188) [-0.1122]
Birth weight less than 2500 grams	0.0312*** (0.0103) [0.0101]	0.0691*** (0.0103) [0.0218]
Mother's Health and Behavior		
Any Complication of Labor and Delivery	-0.0084 (0.0054) [-0.0027]	0.0045 (0.0055) [0.0014]
Mother Used Tobacco During Pregnancy	-0.0017 (0.0100) [-0.0005]	0.0175** (0.0078) [0.0055]
Mother Used Alcohol During Pregnancy	0.0165 (0.0308) [0.0053]	0.1064*** (0.0242) [0.0338]
Number of Prenatal Care Visits	-0.0016 (0.0019) [0.0003]	-0.0034** (0.0016) [-0.0002]
Number of Prenatal Care Visits Squared	0.0001** (0.0001)	0.0001** (0.0001)
Number of Previous Live Births Now Living	--	-0.0122*** (0.0029) [-0.0038]
Cardiac Disease	0.0143 (0.0512) [0.0045]	0.0244 (0.0519) [0.0076]
Diabetes (non-gestational)	0.0132 (0.0194) [0.0042]	-0.0295* (0.0170) [-0.0091]

Renal Disease	0.0254 (0.0901) [0.0081]	0.0336 (0.0838) [0.0105]
Acute or Chronic Lung Disease	-0.0461 (0.0592) [-0.0145]	-0.0209 (0.0538) [-0.0064]
Chronic Hypertension	-0.0083 (0.0342) [-0.0026]	0.0408 (0.0285) [0.0127]
Year Dummies		
1995	-0.0299 (0.0190) [-0.0096]	-0.0604*** (0.0193) [-0.0187]
1996	-0.0488** (0.0193) [-0.0156]	-0.0719*** (0.0193) [-0.0223]
1997	-0.0664*** (0.0210) [-0.0211]	-0.1201*** (0.0207) [-0.0368]
1998	-0.0982*** (0.0234) [-0.0309]	-0.0925*** (0.0226) [-0.0285]
1999	-0.0946*** (0.0272) [-0.0298]	-0.0456* (0.026) [-0.0142]
2000	-0.0743*** (0.0279) [-0.0235]	-0.0189 (0.0268) [-0.0059]
2001	0.0487** (0.0206) [0.0140]	0.0813*** (0.0203) [0.0228]
2002	0.0735*** (0.0207) [0.0222]	0.0782*** (0.0205) [0.0218]
Year Dummies interacted with four or more years of college		
1995	-0.0101 (0.0271) [-0.0033]	-0.0082 (0.0294) [-0.0026]
1996	0.0234 (0.0269) [0.0078]	0.0074 (0.0287) [0.0024]
1997	0.0346 (0.0266) [0.0115]	0.0126 (0.0285) [0.0041]
1998	0.0452* (0.0266) [0.0151]	0.0844*** (0.0279) [0.0276]
1999	0.0577** (0.0265) [0.0193]	0.0459* (0.0278) [0.0149]
2000	0.0901*** (0.0263) [0.0303]	0.0353 (0.0276) [0.0114]

2001	0.0339 (0.0266) [0.0113]	0.0195 (0.0277) [0.0063]
2002	-0.0069 (0.0267) [-0.0023]	-0.0254 (0.0277) [-0.0082]
Year dummies interacted with married		
1995	-0.0161 (0.0246) [-0.0045]	0.0247 (0.0240) [0.0073]
1996	0.0405* (0.0246) [0.0116]	0.0602** (0.0236) [0.0178]
1997	0.0476* (0.0245) [0.0136]	0.1035*** (0.0234) [0.0309]
1998	0.0991*** (0.0245) [0.0288]	0.1125*** (0.0231) [0.0337]
1999	0.1215*** (0.0245) [0.0356]	0.0993*** (0.0229) [0.0296]
2000	0.1065*** (0.0244) [0.0311]	0.0908*** (0.0229) [0.0270]
2001	0.0340 (0.0245) [0.0097]	-0.0632*** (0.0228) [-0.0181]
2002	0.0021 (0.0247) [0.0006]	-0.0749*** (0.0230) [-0.0214]

Notes: *** significantly different from zero at the 99 percent confidence level; ** significantly different from zero at the 95 percent confidence level; *significantly different from zero at the 90 percent confidence level. Three digit industry dummy variables are also included.